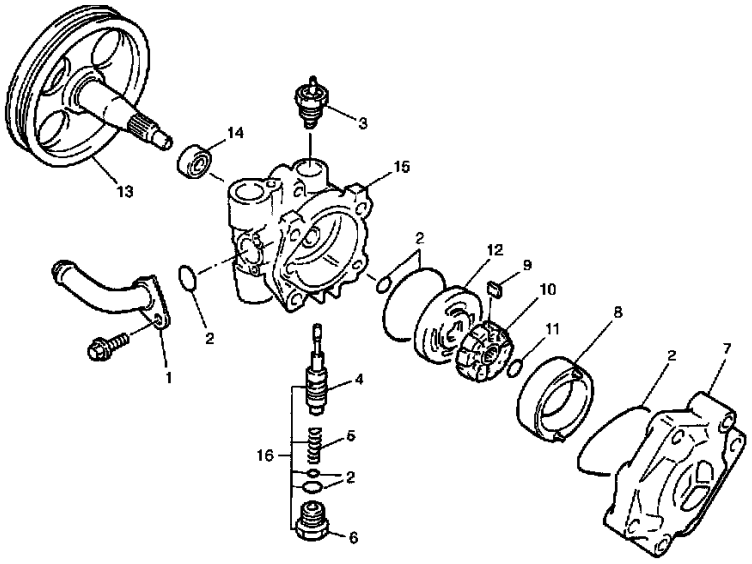
Power Steering Pump: Description and Operation

POWER STEERING (P/S) PUMP



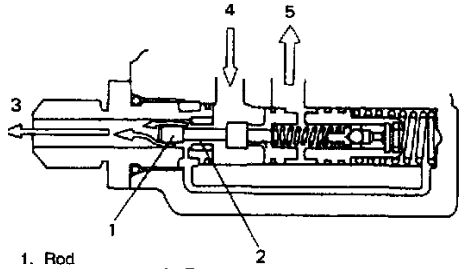
1. Suction connector
2. O-ring
3. Pressure switch
4. Flow control valve (Relief valve)
5. Spring
6. Plug
7. Pump cover
8. Cam ring
9. Vane
10. Rotor
11. Snap ring
12. Side plate
13. Pulley (pump shaft)
14. Oil seal
15. Pump body
16. Flow control valve assembly

Model		Vane type
Hydraulic pressure control	Relieved pressure	7500 kPa (75 kg/cm^2 or 1067 psi) ..... 1.6 liter 8500 kPa (85 kg/cm^2 or 1209 psi) ..... 1.8 liter
	Control device	Flow control valve
		Relief valve
Specified fluid		An specified A/T fluid
Fluid capacity of system		760 – 850 cm^3 (1.61/1.34 – 1.80/1.50 US/Imp. pt)
Power steering pressure switch		Switch turns on (closes) when the pressure is higer than 3100 – 3900 kPa (31 – 39 kg/cm^2, 441 – 554 psi). ECM uses this signal for idle speed control.

The power steering pump is a vane type and is driven by the V-ribbed belt from the crankshaft.

FLOW CONTROL VALVE

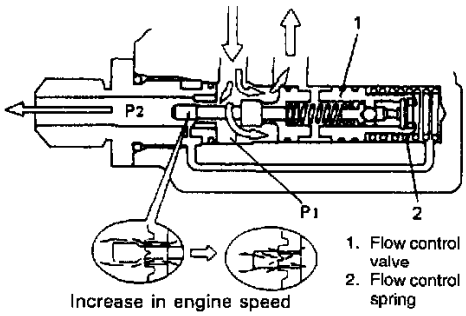
As the discharge rate of the Power Steering (P/S) pump increases in proportion to the pump revolution speed, a flow control valve is added to control it so that the optimum amount of fluid for steering operation is supplied according to the engine speed (driving condition). Described below is its operation at different engine speed.



1. Rod
2. Orifice A_1
3. To gear box
4. From pump
5. To pump

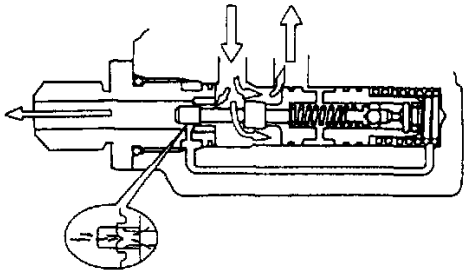
When Idling

The fluid discharged from the pump is supplied through the clearance around the rod in orifice A1 to the gear box.



When Running at Low Speed

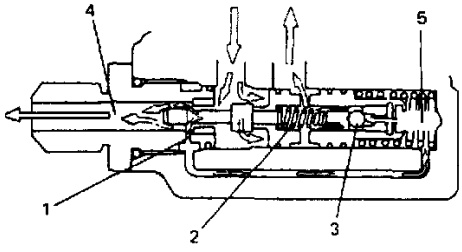
As the engine speed rises, the pump discharge rate increases and causes a pressure difference to occur between both ends of the orifice (P1 - P2). Thus the pressure exceeding the flow control spring force pushes the flow control valve to the right in figure shown, making the opening in the orifice narrower through which only a necessary amount of fluid is fed to the gear box and the excess fluid is returned to the pump.



When Running at High Speed

As the engine speed rises higher, opening in the orifice is made narrower and fluid flow to the gear box reduces. As a result, hydraulic pressure application is slow at the start of the steering wheel turn. This provides straight-ahead stability to suit the driving condition with the steering wheel operated near its neutral position.

RELIEF VALVE



1. Orifice A_2
2. Relief valve spring
3. Steel ball
4. Chamber A
5. Chamber B

The relief valve located in the flow control valve controls the maximum hydraulic pressure.
The steel ball in the relief valve is under the hydraulic pressure in the circuit coming through orifice A2. When the steering wheel is turned and the hydraulic pressure increases higher than 8000 kPa (80 kg/cm2, 1137 psi) , it compresses the relief spring to push the steel ball which then allows the fluid to flow to the P/S pump.
Such relief valve operation causes a pressure difference to occur between chambers A and B.
Then the flow control valve moves to the right to make opening in orifice A1 narrower, maintaining the hydraulic pressure constant.